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AUTHOR Cherdack, Arthur N.; Landini, Albert J.
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ABSTRACT

Geosystems are computerized techniques for matching information to places. They correlate demographic and socioeconomic information with locations on the surface of the earth. Using geosystems the college administrator can: (1) improve his overall planning, (2) define college service areas, (3) assist in site selection for new programs and facilities, and (4) develop grant proposals. A geosystem contains a geographic base file and a file containing the information to be mapped. In addition, a program for merging the two files is needed. When the computer is fed the base map, the pertinent information file, and the program, the desired map is automatically produced. Computers may eventually assist in the process of student counseling, i.e., students would receive periodic mailings of suggested changes in program, vocation, occupation, or even career. Such a counseling service could be extended to nonstudents as well as students, and the college would thus become a clearinghouse for community-wide job placement, provide essential vocational training and retraining, and guide citizens through the complex lattice of job opportunities. (DB)

- GEOSYSTEMS -

A MEANS TO UNDERSTANDING YOUR COMMUNITY

by

Arthur N. Cherdack
Albert J. Landini

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PREFACE

This paper contains the text of the audio visual presentation made to conference attendees of the CJCA Research and Development Conference.

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Arthur N. Cherdack
Director
Educational Research and Analysis
Los Angeles Community College District

Albert J. Landini
Coordinator
Los Angeles Community College
District Data Base Team

As a Community College Administrator you are probably interested in learning new ways of effectively delivering educational services to your community.

You might also be interested in learning more about your college service area and just who it is you are serving and not serving.

This presentation will introduce you to a series of research tools called "geosystems." Geosystems address themselves to the interests just expressed and also to a number of others that will be discussed later in this presentation.

Let us begin by defining geosystems and noting some of their general features and applications. Then we will view some of the specific uses made of geosystems in the Los Angeles Community College District. Finally, we will dwell upon some of the more technical aspects of geosystems and see how they might be applied in future endeavors.

What are geosystems? Geosystems are computerized techniques for matching information to places. They correlate demographic and socio-economic information with locations on the surface of the earth.

A fully automated geosystem involves two information files. These are a geographic base file, which is in effect a computer map, and an information file, which is the data you wish to relate to locations on the map. These two files allow researchers to combine internally-generated course and student data with externally-obtained data of many types.

An important general feature in regard to geosystems is their adaptability.

Geosystems can benefit a range of institutions; from a small town fire department to a large community college. Community colleges, of course, are traditional users of automated data processing techniques and could for the most part utilize a computerized technique like geosystems with a minimum of difficulty.

By means of geosystems the administrator is able to perform a variety of functions. He can: (1) improve his overall planning - for instance, by means of assessing the needs for particular course offerings, (2) define college service areas, (3) assist in site selection for new programs and facilities, and (4) develop grant proposals. It should be stressed that these are only a sample of many possible geosystems functions.

In regard to planning, geosystems can inform the decision-maker of the particular employment patterns that exist in the area surrounding his college. The decision-maker can then analyze these employment patterns to determine if the need exists for specific types of educational programs. The end result of such assessment could be the creation of courses and programs that are directly responsive to the needs of the community.

Geosystems also have an important function in determining college service areas. For instance, this map, from an actual study done for the Los Angeles Community College District, shows the service area for Pierce College. Note that the concentrations of students are heaviest around the campus, but that students come from as far east as Glendale and from as far south as Westchester.

Service area data such as these help us to eliminate excessive student crossover within and between Community College Districts. In addition they allow

us to define areas needing specialized courses by revealing instances where students living outside of a college's service area travel to that college for specialized course offerings. Finally, service area data permit a listing of out-of-district students. This lattermost function is performed by matching internal student address information with an external file - in this case, a census file. (This particular technique is called ADMATCH and will be discussed at a later point).

A third important function of geosystems is to aid in site selection when major new campuses or programs are proposed. Demographic analysis and client studies in the area of a proposed site are essential in predicting the size and composition of the probable enrollment.

Finally, geosystems can provide essential information for preparing grant proposals. The grant administrator may want to know, for example, how many potential students live in a specially-funded area, such as a Model Cities neighborhood.

Now let us examine in some detail the specific uses made of geosystems in the Los Angeles Community College District. Of primary interest is a study conducted by the Community College Data Base Team in conjunction with the Los Angeles Community College District Research Council.

The Data Base Team study used data on enrolled student residence locations and associated census data to provide information for researchers and decision-makers. Here is an example of a product of that study. This computer map from the report shows median years of education completed for persons age 25 and over in 1970 for the entire District. In maps like this, patterns become

immediately apparent, slight differences stand out, and comparisons can be easily made. Data such as these were also presented in tabular form to permit more detailed statistical analysis. The first Data Base Team report presented map and tabular data for ten population characteristics relating to age, education, income and race of students throughout the District.

An especially valuable feature of the final report was the production of computer maps and tables of the student enrollment patterns for each of the eight District colleges, the District as a whole, and the enrollment in instructional television. This map shows the student enrollment pattern for Los Angeles City College.

The total cost of producing the first phase report of the Community College Data Base Team, including planning, programming and producing twenty computer maps, was relatively low.

This year the Data Base Team is addressing itself specifically to the educational needs of veterans and handicapped persons. It is also developing additional files of student characteristic data as well as the capacity of displaying those items in mapped form. A final task for this year is to provide the District with defined service areas for each of its eight colleges.

In later phases of the study even more complex analyses will be possible. It should not be too long before the District has its own ongoing machine-readable files to use in monitoring community needs. Ultimately, the District could have an on-line terminal linking its files to those of other agencies.

Now, as promised earlier, let us look in more detail at the components of a geosystem.

As previously mentioned, a geosystem contains a geographic base file - that is, a blank map on computer tape - and a file containing the information to be mapped.

The geographic base file generally contains numbered coordinates which locate street intersections, street names, address ranges, and adjacent Census Tract and Census Block numbers. A commonly used type of geographic base file is called the ACG-DIME file. This file utilizes the Address Coding Guides of the Census Bureau and makes those Guides machine-readable through a process known as Dual-Independent Map Encoding.

The second geosystem file, the information file, may consist of a variety of data, such as census information, Tax Assessors' tapes, Police and Fire Department files, Planning Department files, and Health Department files. Some of this information is in machine-readable form, while other data must be key-punched into useful form. However, all data used in geosystems have one thing in common: a house address of some type for each data item.

In addition to a geographic base file and an information file, a geosystem needs instructions for merging them. These instructions are the "program." In our study the program is called ADMATCH, short for address matching. ADMATCH was produced by the Census Bureau for its Census Use Study in New Haven, Connecticut.

Having been fed the base map, the pertinent information file, and the ADMATCH program, the computer can automatically produce the desired map. While the computations are nearly instantaneous, the machine-printing of the map may take a few minutes. On this map, showing median family income in Los Angeles County by Census Tract, darker shadings are used to represent higher median incomes.

Computer printed maps are a relatively recent phenomenon, but the technique is rapidly evolving and it is inevitable that such maps will become increasingly important tools for making planning decisions.

This map, another from the Data Base Team Study, shows areas where student-aged persons (nineteen to twenty-five) are concentrated in Los Angeles County. Eventually it would be desirable to develop a series of maps which would depict specific types of unmet educational needs throughout the District. In such maps, pockets of probably high demand for educational services of a certain type could be illustrated. Various need indices could thus be developed, by service area, throughout the District.

Taking a moment to look into the future, computers may eventually assist in the process of counseling students. Students would receive periodic mailings of suggested changes in program, vocation, occupation, or even career. The "counseling" capability might be obtained by matching each student's personality profile, recorded desires, and performance record with success probability patterns discovered through geosystems analysis.

Ultimately, such a counseling service could be extended to non-students as well as students, and could continue life-long. Thus the college would become a clearinghouse for community-wide job placement, provide essential vocational training and retraining, and guide citizens through the increasingly complex lattice of job opportunities.

Implementation of a program embracing all of these features is clearly a long way down the road. We include it because it is a conceivable long-term goal and serves to point out the endless possibilities for useful applications of geosystems in the field of education.

But perhaps a word of caution is in order:

The decision-making equation includes both adequate information and good judgement.

Just as good judgement alone does not guarantee correct decisions in the absence of adequate information, information without good judgement can be worse than worthless.

The administrator who recognizes the limitations as well as the potentialities of this tool can find geosystems an invaluable aid in fulfilling one of his primary responsibilities, the effective delivery of education to the community.

This presentation was produced by the Los Angeles Community College Base Team in cooperation with the Los Angeles Community College District Research Council.